1. Which of the following is NOT true of heme?
2. It contains iron (Fe) within the protoporphyrin ring
3. It is covalently bound within the globin fold
4. It is found within a hydrophobic pocket in the globin fold
5. It binds oxygen
6. Hemoglobin:
7. Has 4 oxygen binding sites
8. Is a tetramer made of two alpha and two beta subunits
9. Is similar to myoglobin in terms of its subunits
10. Has sites that bind 2,3-BPG and CO2
11. All of the above
12. None of the above
13. When the hill coefficient equals 1:
14. You see positive cooperativity such as O2 binding to myoglobin
15. You see no cooperativity such as when O2 binds to hemoglobin
16. You see no cooperativity such as when O2 binds to myoglobin
17. You see negative cooperativity such as when O2 binds to hemoglobin
18. In the Monod (concerted) model for positive cooperativity:
19. There are 4 conformational states
20. Low oxygen tension favors the T-state
21. High oxygen tension favors the T-state
22. R and T states can exist together
23. Which of the following is a heterotrophic effector?
24. CH3
25. His residue
26. CO2
27. Heme
28. When oxygen binds to hemoglobin:
29. The heme molecule is planar in shape
30. The C-terminus is displaced
31. Salt bridges are broken
32. All of the above
33. The majority of CO2 found in the blood is in which form?
34. CO2 (gas)
35. HCO3-
36. HbCO2-
37. Only oxygen is carried in the blood
38. Which of the following gives the correct order of increasing affinity for oxygen?
39. Fetal Hb; cytochromes; Fetal Mb; maternal Hb
40. Cytochromes; fetal Hb; fetal Mb; maternal Hb
41. Maternal Hb; fetal Hb; fetal Mb; cytochromes
42. Maternal Hb; fetal Mb; fetal Hb; cytochromes
43. In sickle cell disease, a single amino acid substitution occurs in the hemoglobin protein. The normal residue \_\_\_\_\_\_\_\_ gets mutated into \_\_\_\_\_\_\_\_\_.
44. Val, Glu
45. Glu, Val
46. Thr, Pro
47. Glu, Pro
48. The enzyme that catalyzes the committed step in the TCA cycle is:
49. Aconitase
50. Alpha-Ketoglutarate dehydrogenase complex
51. Isocitrate dehydrogenase
52. Succinyl CoA synthetase
53. How many NADH are made in the TCA cycle?
54. 1
55. 2
56. 3
57. 4
58. Which of the following is NOT a coenzyme needed in the pyruvate dehydrogenase complex?
59. CoA
60. Thiamine
61. NADH
62. Lipoic acid
63. Part of the structure of CoA contains one of the B vitamins that cannot be made by humans, and thus must be obtained through the diet. The name of this vitamin is:
64. Thiamine
65. Pantothenic acid
66. Riboflavin
67. Niacin
68. The enzyme in the TCA cycle that exhibits substrate level phosphorylation is:
69. Alpha-ketoglutarate dehydrogenase
70. Fumarase
71. Aconitase
72. Succinyl CoA-synthetase
73. Each of the four complexes in the electron transport chain have prosthetic groups, such as heme, flavins, and quionones. The purpose of these groups is to carry electrons to oxygen.
74. True
75. False
76. The final step of the electron transport chain, or complex 5:
77. Produces water
78. Utilizes the enzyme ATP synthase
79. Produces ATP from a proton gradient
80. All of the above
81. Which of the following is a substance that uncouples oxidative phosphorylation?
82. Curare
83. 2,4-Dinitrophenol
84. Cyanide
85. Barbiturate
86. Which of the following is/are true of Coenzyme Q?
87. It is a lipid soluble compound
88. It interacts with all 4 complexes
89. It accepts hydrogens from both NADH and FADH2
90. Both A and C
91. None of the above
92. Which of the following are cell-to-matrix junctional adhesions?
93. Tight junctions
94. Gap junctions
95. Hemidesmosomes
96. Focal attachments
97. Both B and C
98. Both C and D
99. Which of the following are cell-to-cell non-junctional adhesions?
100. Proteoglycan surface molecules
101. Integrins
102. Cadherins
103. None of the above
104. Both B and C
105. Which of the following gives the correct series of extravasation steps?
106. Activation; migration; trapping; adhesion
107. Activation; trapping; activation; migration
108. Adhesion; activation; trapping; migration
109. Activation; trapping; adhesion; migration
110. Which step of extravasation utilizes metalloproteases?
111. Activation
112. Trapping
113. Adhesion
114. Migration
115. How does a leukocyte know where to move?
116. It has a map
117. Chemotaxis
118. It doesn’t know, it just goes wherever
119. Temperature gradients
120. The longest portion of the cell cycle is:
121. G1
122. G2
123. S
124. M
125. G0
126. What is the role of p53 in the cell cycle?
127. To push the cell from G1 to the S phase
128. To activate cyclins
129. To arrest the cell cycle if DNA damage is detected
130. To phosphorylate Rb
131. The p16 gene:
132. Encodes a protein that will induce cellular senescense when cells have divided too many times, decreasing the likelihood of cancer
133. Is active in moles found in our skin
134. Can cause self-renewing ells, like stem cells, to become senescent, leading to increased aging
135. All of the above
136. Which of the following is true of the Human Papilloma Virus?
137. The virus produces 2 viral proteins called E6 and E7
138. Viral proteins produced by HPV deactivate p16 and cyclins
139. The virus can cause cervical and uterine cancer in women
140. Viral proteins deactivate Rb and p53, leading to uncontrolled proliferation
141. All of the above
142. Only A, C, and D
143. Only A and C
144. Which of the following is NOT true of enzymes?
145. They do not change the standard free energy change of the reaction
146. They decrease energy of activation
147. They accelerate reaction rate
148. They are not consumed during the reaction
149. None of the above
150. If you have a –ΔG:
151. The reaction is spontaneous
152. The reaction is at equilibrium
153. The reaction has a fast rate
154. The reaction is thermodynamically favorable
155. Both A and D
156. Which of the following is an incorrect pairing?
157. Ligase—break C-C or C-N bonds through elimination reactions and create double bonds
158. Transferase—group transfer reactions
159. Oxidoreductase—redox reactions
160. Isomerase—switch a compound from one isomer to another
161. What is the effect of temperature on enzyme activity?
162. Activity increased 2-fold for every 10 degrees C increase
163. Temperature of 100 degrees C increase activity 20 fold
164. Denatured proteins due to high temperatures never can reform into their correct conformation
165. Enzymes react the same at all temperatures
166. Competitive enzyme inhibitors:
167. Resemble the substrate of that enzyme
168. Have less of an effect when concentration of substrate increases
169. Changes Vmax
170. Increases Km of substrate
171. All of the above
172. A, B, and D
173. Irreversible inhibitors work by forming a noncovalent bond with the enzyme.
174. True
175. False
176. Which of the following can regulate enzymatic activity?
177. Covalent modification
178. Allosteric effectors
179. Changes in enzyme concentration
180. Both A and C
181. All of the above

Answers:

1. B
2. E
3. C
4. B
5. C
6. D
7. B
8. C
9. B
10. C
11. C
12. C
13. B
14. D
15. A
16. D
17. B
18. D
19. F
20. E
21. D
22. D
23. B
24. A
25. C
26. D
27. F
28. E
29. E
30. A
31. A
32. F
33. B
34. E